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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/824,193	04/02/2001	Johannes-Jorg Rueger	10744/4200	1578

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EXAMINER	
BUDD, MARK OSBORNE	
ART UNIT	**PAPER NUMBER**
2834	

DATE MAILED: 10/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/824,193	RUEGER ET AL.	
	Examiner	Art Unit	
	Mark Budd	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

USC 102 as anticipated by Japan (753) or Japan (684)-withdrawn.

Clams 1, 2, 8, 9, 18, 19, 25 and 26 are rejected under 35 USC 102(b) as anticipated by Moloney. Moloney teaches a stack of piezo-electric elements (2) that expand and contact when charged by a drive circuit (see fig. 3). Expansion and contraction of the stack is achieved by changing the thickness dimension of each piezo element. Because various factors such as ageing, temperature and wear can change the total travel distance (stroke) of the stack, Moloney provides a typical servo loop with a position sensor and feed back circuit to adjust the input for changes in the total stroke see col. 2 ln 15-23, col. 3 ln 2-43). The inherently compensates for changes in the thickness of any and all piezo elements in the stack.

Claims 3-7, 10-14, 20-24, and 27-31 are rejected under 35 USC 103(a) as being unpatentable over Moloney in view of Takada or Jaenker.

Moloney teaches compensating a stack of piezo-electric elements in a fuel injector for travel distance based on variation, between actual and ideal conditions. Takada (see abstract) and Jaenker (see abstract) teach measuring the relationship between voltage and displacement and thus obtaining a correction factor. It would have been obvious to one of ordinary skill in the art to select from among known compensation techniques and thus to use voltage factors in the actuator of Moloney.

Claims 15-17 and 32-34 are rejected under 35 USC 103(a) as being unpatentable over Moloney in view of Takada or Jaenker as applied to claims 3-7 and 10-14 above, and further in view of Basrron or Estevenon.

These claims add that an EEPROM is used to record manufacturing history developed correction factors. Each of Barron (col. 3 ln 1-9) (col. Ln 32-36) teach using an EEPROM to record the history of each value of an injector system. To apply this known compensation method to a valve using a specific transductor (piezo-electric vs magnetic) would have been within the skill expected of the routineer and therefore obvious to one of ordinary skill in the art.

Regarding applicants remarks in the Brief and Reply Brief pleas note the following.

Applicant argues that Moloney does not compensate for deviations caused by variations in the piezo-electric elements layer thickness ---". The examiner disagrees. The movement of the actuator is caused by variations in the piezo-electric elements thickness. Thus to correct for the amount of expression not being at the desired valve, one is both explicitly and inherently compensating for deviations caused by variations in the piezo-electric element's thickness. Note that even if thickness was not explicitly an issue in Moloney, inherently provides correction of any factor that would lead to an incorrect travel value (stroke). Thus if a kangaroo kicked the actuator and the serve adjusted the output stroke to the desired final position, Moloney would have inherently compensated for kangaroo kicks. Regarding claims 8 and 25, the initial voltage applied by Moloney would have been predetermined at some point in the design process (thus a definition is made). Then, as things are actually measured in the actual operation the feed back servo loop compensates for any errors in the initial charging voltage. It is a given that the thickness of a piezoelectric element will change with temperature

changes due to the temperature coefficient of thermal expansion. It is also a given that the thickness of a piezoelectric element changes with age and operating cycles due to hysterics. There is a starting point in time for Maloney where the stack of piezo elements has a certain total length (due to the thickness of each layer). An initial voltage expands or contracts the stack a certain length.

Over time, (due to hysteresis) and a environmental temperatures change, the stack length and change in stack length both would change. Malony teaches preventing or compensating for such changes by providing a simple servo feed-back loop. Malony thus inherently compensates for thickness changes in the piezo elements.

Regarding claims 3, 10, 20 and 27m, it is initially noted that clam 20 only calls for at least one of a normal current and a correction factor" to be considered. Note that in any of the references the normal voltage and normal current" would be considered the initial or uncorrected values (e.g. at start-up of the device) or the predicted or expected voltage determined Cohen designing the unit. A correcting factor is what the servo loop determines, by comparison of a e.g. desired displacement with an actual displacement. Thus any one of the references that begin with an initial set of value, sense an undesired result and perform a correction can fairly be interpreted as considering a normal voltage, normal charge and applying a correction factor to obtain the new desired voltage and current.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Budd Mark whose telephone number is (571)272-2019. The examiner can normally be reached on Monday-Thursday from 6am to 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ramirez Nestor, can be reached on ***. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Budd/ds

10/14/04

MARK O. BUDD
PRIMARY EXAMINER
ART UNIT 2834